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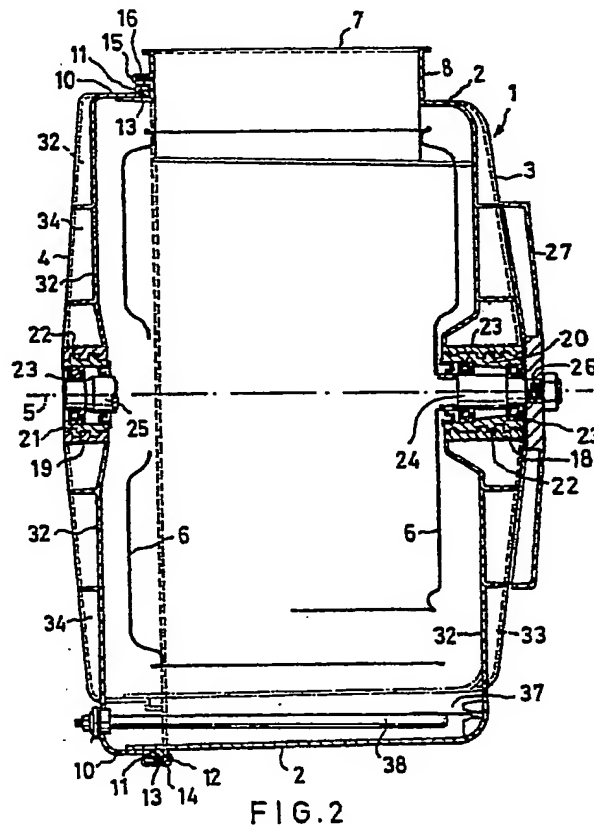
(56) Documents Cited
GB 2261881 A GB 2157326 A GB 2121834 A
EP 0400467 A2 EP 0212259 A2 EP 0043429 A1

(58) Field of Search
UK CL (Edition L) D1A AFA AFB AFC
INT CL⁵ D06F 37/26 39/12
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Plastic

(54) Tub for a top-loading washing machine

(57) A wash tub (1) for a top loading washing machine, in which a cylindrical wash drum (6) is supported for rotation about a horizontal axis, is of generally cylindrical form with two end walls (3 and 4) each of which is of moulded plastics material and comprises a plurality of sectors (32, 33) relatively displaced along the axis (5) of the drum and joined along their edges by axially extending webs in Greek-fan fashion. One end wall (3) is moulded integrally with the cylindrical wall (2) of the tub and the other end wall (4) is moulded separately and is connected to the cylindrical wall (2) with a sealing strip (13) and clips (14).



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At least one drawing originally filed was Informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1990.

FIG. 1

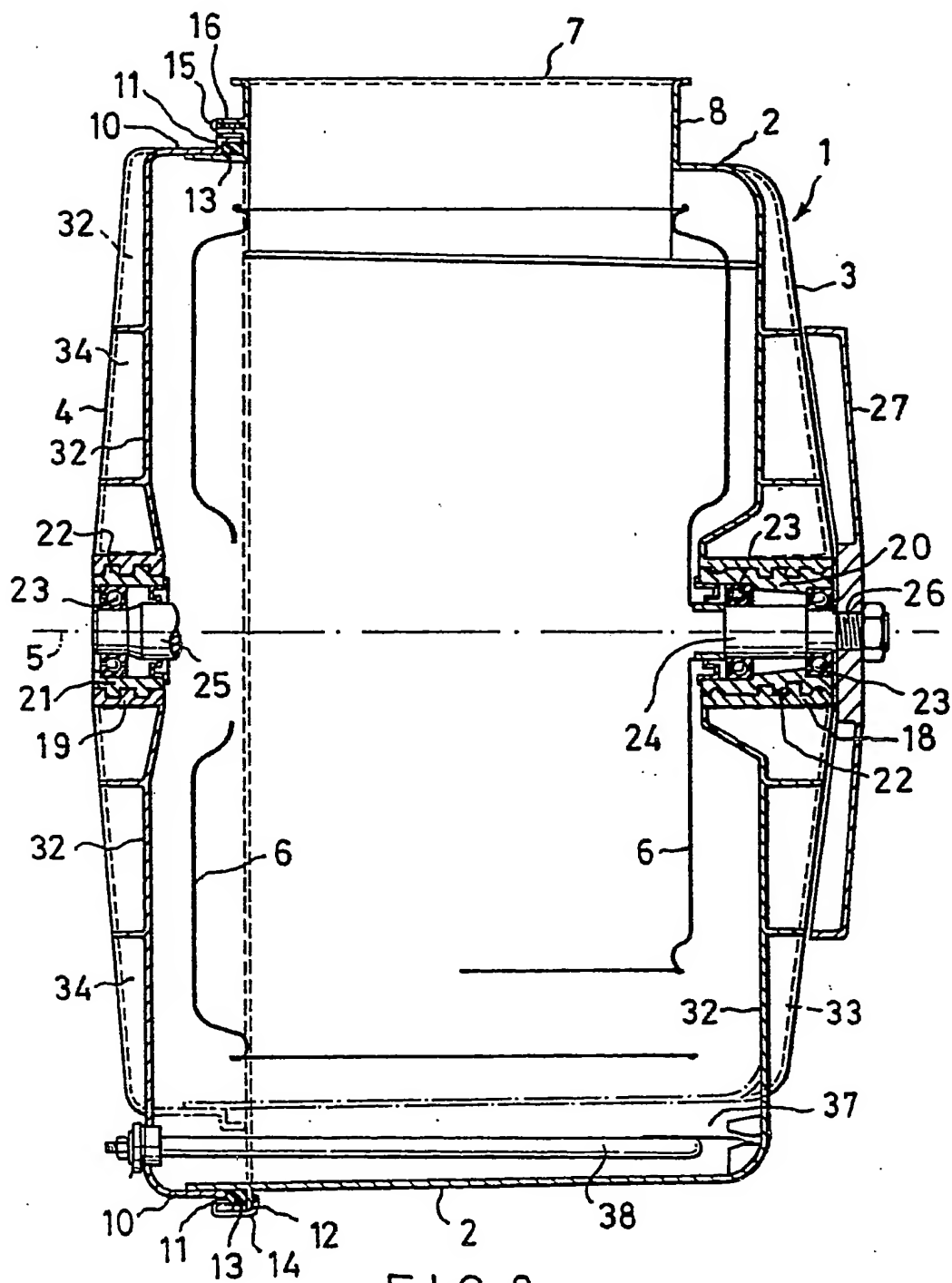
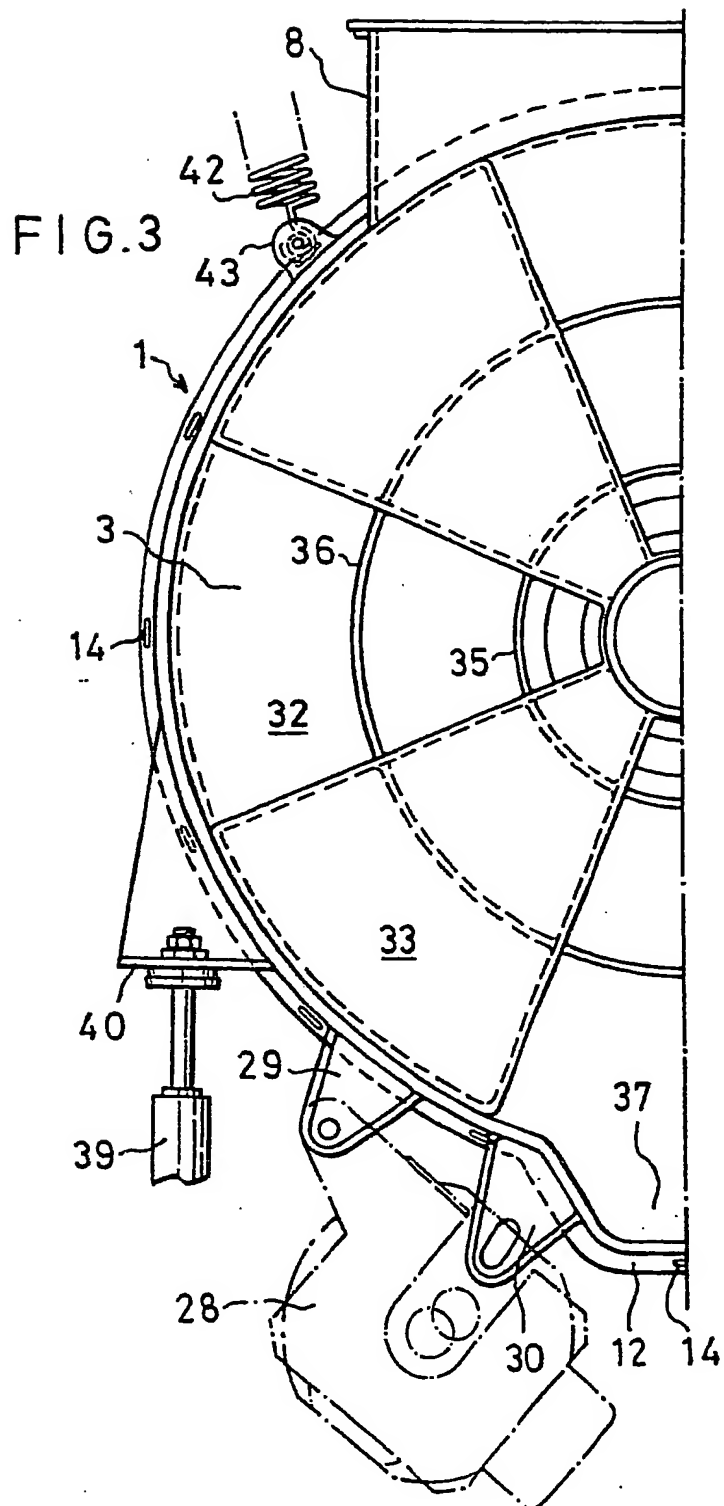


FIG. 2



WASH TUBS

This invention relates to wash tubs for so-called top-loading washing machines of the kind in which a cylindrical wash drum is supported by the wash tub for rotation about a horizontal axis. Such wash tubs have an access opening in their top. An access opening in the cylindrical wall of the drum aligns with that in the wash tub in the rest position of the drum to permit insertion and removal of articles into and from the drum.

The wash tubs conventionally are made of metal as is the drum. Wash tubs of plastic material have already been proposed but none have so far been manufactured capable of withstanding the high rotational spin speeds required today.

The object of the present invention is to provide a wash tub which is made at least in part from plastics material and is capable of supporting the drum at high rotational speeds up to say 1200 r.p.m. without failing prematurely.

According to the invention the wash tub is of generally cylindrical form with two end walls arranged to support the drum rotationally between them, each end wall being of moulded plastics material and comprising a plurality of sectors, adjacent ones of which are relatively displaced along the rotational axis of the drum and are joined along their radial edges by axially extending webs.

Preferably the end walls are moulded from a plastics composition which is free from foaming agents in

similar manner to the back plates described in European Patent No. 0097483.

5 In one advantageous construction one of the end walls is moulded integrally with the cylindrical side wall of the wash tub and the other end wall is moulded separately and sealing secured to the cylindrical side wall.

The plastics material from which at least the end walls are moulded may be a polypropylene composition containing glass fibre reinforcement.

10 One construction of wash tub in accordance with the invention will now be described by way of example with reference to the accompanying drawing in which:

Figure 1 is an elevational view of one end of the wash tub, Figure 2 is a sectional view on the longitudinal centre line of the wash tub, and
15 Figure 3 is an elevational view of one half of the other end of the wash tub.

Referring to the drawings, the wash tub 1 has of generally cylindrical form and has cylindrical side wall 2 and end walls 3 and 4. The end wall 3 is moulded
20 integrally with side wall 2 by injection moulding and the end wall 4 is moulded separately by injection moulding and is sealingly secured to the side wall 2 as will be described.

25 In use the wash tub is disposed with its longitudinal axis 5 horizontal as seen in Figure 2 and supports a wash drum of for example stainless steel shown diagrammatically in outline at 6 for rotation about the axis 5. The side wall 2 is provided with an access opening 7 in

its top, surrounded by an upstanding rectangular wall 8 moulded integrally with the side wall 2. The drum 6 is also provided with an access opening which in the rest position of the drum 6 aligns with the access opening 7. This alignment can be achieved either by weighting the drum 6 or controlling its motor drive.

The end wall 4 is of shallow cup shape and its side 10 is a sliding fit over the outside of the side wall 2. The rim of the cup shaped end wall 4 has an outwardly turned annular flange 11 and the cylindrical side wall 2 has an external flange 12 around it. A rubber sealing strip 13 is located between the flanges 11 and 12 and is held in compression by spring clips 14 which bridge across and engage the flanges 11 and 12. The clips are spaced around the periphery of the flanges 11 and 12 except in the region of the upstanding wall 8. In this region the compression of the sealing strip 13 is effected by screws 15 which pass through small lugs 16 formed in the flange 11 and screw into small bosses on the upstanding wall 8.

Each of the end walls 3 and 4 is formed with a central hub 18, 19 in which a bearing housing 20, 21 is located during moulding of the end wall 3, 4. Each of the bearing housings 20 and 21 of end walls 3 and 4 respectively have annular ribs 22 which become embedded in the plastics material of the hubs 18 and 19 to secure the bearing housings 20 and 21 firmly in the hubs 18 and 19. The bearing housing 20 of end wall 3 is sufficiently long to locate two roller bearings 23. The bearing housing 21 supports one roller bearing 23. The drum 6 is supported in

the bearing 23 by stub shafts 24 and 25. The stub shaft 24 extends at 26 beyond the end wall 3 and mounts a driving pulley 27 for rotating the drum 6. The pulley 27 connects with a driving motor 28 (Figure 3) which is mounted on the wash tub 1 through lugs 29 and 30 integrally formed with the wash tub 1.

Each of the end walls 3 and 4 is basically of the same "Greek Fan" construction as described in our European Patent No. 0097483. Thus each of the end walls 3 and 4 is generally circular in shape and comprises a plurality of sectors 32, 33 extending from the periphery of the end wall to the central hub 18. At the central hub 18 adjacent sectors 32, 33 are displaced axially of each other. Thus as seen in the drawings the sectors 32 are inboard of the bearing housings 20 and 21 and the sectors 33 are outboard of the bearing housings 20 and 21. Adjacent sectors 32 and 33 are interconnected along their radial edges by axially extending webs 34. The thickness of the sectors 32 and 33 is the same as or greater than the thickness of webs 34. Annular webs 35 and 36 are integrally formed in each of the end walls 3 and 4.

The side wall 2 together with end wall 3 and the end wall 4 may be moulded from a polypropylene composition containing between 20% to 30% by weight of glass fibre and in the absence of any foaming agent.

The side walls 2 and end walls 3 and 4 are shaped to define a sump 37 which contain in known manner a sheathed wire electric heating element 38.

The wash tub 1 may be supported in an outer casing

(not shown) by shock absorber type mounting 39 through brackets 40 integrally formed on the wash tub 1 or by spring suspensions 42 connected to lugs 43 integrally formed with the wash tub 1.

5 In order to reduce moulding pressures, gas injection moulding may be used to produce the components of the wash tub. In gas injection moulding a gas is introduced into the moulding machine at appropriate points and flows into the mould together with the molten plastics material.

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C L A I M S

1. A wash tub for a top loading washing machine of the kind in which a cylindrical wash drum is supported within and by the wash tub for rotation about a horizontal axis, wherein the wash tub is of generally cylindrical form with two end walls arranged to support the drum rotationally between them, each end wall being of moulded plastics material and comprising a plurality of sectors, adjacent ones of which are relatively displaced along the rotational axis of the drum and are joined along their edges by axially extending webs.
2. A wash tub according to Claim 1, wherein the adjacent sectors incline towards each other proceeding from the radially inner edges to the radially outer edges of the sectors.
3. A wash tub according to Claim 1 or 2, wherein the end walls are moulded from a plastics composition which is free from foaming agents.
4. A wash tub according to any preceeding Claim, wherein the wash tub comprises the two end walls and a cylindrical side wall extending between them, one of the end walls being moulded integrally with the side wall and the other moulded separately.
5. A wash tub according to Claim 4, wherein the separately moulded end wall is a sliding fit over the side wall and is sealed to the side wall by a sealing strip located between facing flanges on the side wall and end wall respectively.

6. A wash tub according to Claim 5, wherein the sealing strip is clamped between the flanges by spring clips engaging the flanges.

7. A wash tub according to any preceeding Claim and
5 moulded from a polypropylene composition containing between 20% and 30% by weight of glass fibre in the absence of any foaming agent.

8. A wash tub substantially as hereinbefore described with reference to the accompanying drawings.

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Relevant Technical Fields

- (i) UK Cl (Ed.M) D1A (AFA, AFB, AFC)
(ii) Int Cl (Ed.5) D06F 37/26, 39/12

Search Examiner
ALEX LITTLEJOHN

Date of completion of Search
8 DECEMBER 93

Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii) ONLINE DATABASES: WPI

Documents considered relevant
following a search in respect of
Claims :-
1-8

Categories of documents

- X: Document indicating lack of novelty or of inventive step. P: Document published on or after the declared priority date but before the filing date of the present application.
Y: Document indicating lack of inventive step if combined with one or more other documents of the same category. E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.
A: Document indicating technological background and/or state of the art. &: Member of the same patent family; corresponding document.

| Category | Identity of document and relevant passages | | Relevant to claim(s) |
|----------|--|---|----------------------|
| Y | GB 2261881 A | (ZANUSSI) see whole document, eg page 3 lines 11-34 | 1-4, 7 |
| Y | GB 2157326 A | (PHILIPS) see whole document eg. page 2 lines 48-71 | 1-7 |
| Y | GB 2121834 A | (REED) see whole document | 1-3, 7 |
| Y | EP 0400467 A2 | (INDESTIT) see whole document, eg column 1 lines 23 and column 3 lines 8, 9 | 1-7 |
| Y | EP 0212259 A2 | (ZANUSSI) see whole document, eg. page 1 lines 6-10 and page 2 lines 35, 36 | 1-7 |
| Y | EP 0043429 A1 | (ZANUSSI) see whole document, eg. page 4 lines 10,11 and page 5 lines 20-23 | 1-3, 7 |

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).